CLAIMS

What is claimed is:

1. A plasma reactor, comprising each openly:
first, second and third power generators coupled to one of upper and lower electrodes; and
a controller for selectively activating said first, second and third power generators.

2. The plasma reactor of claim 1 wherein said first power generator is coupled to said upper electrode and said second and third power generators are coupled to said lower electrode.

3. The plasma reactor of claim 2 wherein said second power generator is configured to operate at a frequency of at least three times an operational frequency of said third power generator.

4. The plasma reactor of claim 2 wherein said first power generator is configured to operate at a frequency of at least greater than or equal to each of a operational frequency of said second power generator and a operational frequency of said third power generator.

5. The plasma reactor of claim 2 wherein said controller is operable to place said first power generator in an inactive mode and said second and third power generators in an active mode.

6. The plasma reactor of claim 2 wherein said controller is operable to place said first and third power generators in an active mode and said second power generator in an inactive mode.

7. The plasma reactor of claim 2 wherein said controller is operable to place said first and second power generators in an active mode and said third power generator in an inactive mode.

8. The plasma reactor of claim 2 wherein said controller is operable to place said first, second and third power generators in an active mode.

9. The plasma reactor of claim 2 wherein said controller during a process is operable to configure said first, second and third power generators to a first activation configuration during a first phase thereof and to reconfigure said first, second and third power generators to a second activation configuration during a second phase thereof.

10. The plasma reactor of claim 2 wherein said controller is operable to configure said first, second and third power generators to a plurality of activation configurations during a corresponding plurality of phases of a duty cycle of a process.

11. The plasma reactor of claim 10, wherein said controller is further operable to control power levels of said first, second and third power generators during said plurality of activation configurations.

12. The plasma reactor of claim 1 wherein each of said first, second and third power generators is capacitively-coupled to one of said upper and lower electrodes.

13. The plasma reactor of claim 1 wherein said second power generator operates at a frequency of about 13.5 MHz to about 60 MHz.

14. The plasma reactor of claim 1 wherein said first power generator operates at a frequency of about 40 MHz to about 100 MHz.

15. The plasma reactor of claim 1 wherein said third power generator operates at a frequency of about 1 MHz to about 13.5 MHz.

16. A plasma reactor, comprising:

a vacuum chamber including upper and each electrodes therein;

first, second and third power generators respectively operably coupled one of to said upper and lower electrodes; and

a controller for selectively activating said first, second and third power generators.

17. The plasma reactor of claim 16 further comprising a wafer table, wherein said lower electrode is coupled to said wafer table and said upper electrode arranged above said wafer table.

18. The plasma reactor of claim 16 wherein each of said first, second and third power generators is capacitively-coupled to one of upper and lower electrodes.

19. The plasma reactor of claim 16 wherein said first power generator is capacitively-coupled to said upper electrode and said second and third power generators are capacitively-coupled to said lower electrode.

20. The plasma reactor of claim 19 wherein said second power generator is configured to operate at a frequency of at least three times a frequency of said third power generator.

21. The plasma reactor of claim 20 wherein said second power generator is configured to operate at a frequency of about 13.5 MHz to about 60 MHz.

22. The plasma reactor of claim 20 wherein said first power generator is configured to operate at a frequency of about 40 MHz to about 100 MHz.

23. The plasma reactor of claim 20 wherein said third power generator is configured to operate at a frequency of about 1 MHz to about 13.5 MHz.

24. The plasma reactor of claim 16 wherein said controller is operable to place said first, second and third power generators in a plurality of activation configurations during a corresponding plurality of phases of a duty cycle of a process.

25. A method of generating a plasma in a plasma reactor, including a vacuum chamber containing a gas and first, second and third electrodes therein operably coupled to respective first, second and third power generators, The method comprising:

configuring said first, second and third power generators to a first activation configuration during a first phase of said etch process; and

reconfiguring said first, second and third power generators to at least a second activation configuration during at least a second phase of said etch process.

26. The method of claim 25 wherein said configuring comprises activating said first and third power generators and deactivating said second power generator during said first phase of said process.

27. The method of claim 26 wherein said reconfiguring comprises activating said second and third power generators and deactivating said first power generator during said second phase of said process.

28. The method of claim 25 further comprising reconfiguring said first, second and third power generators to a third activation configuration during a third phase of said etch process.

29. A method of etching a semiconductor wafer in a plasma reactor, comprising:

generating first, second and third power signals at upper and lower electrodes further respectively coupled to first, second and third power generators; and

individually activating said first, second and third power generators to control said etching of said semiconductor wafer.

30. The method of claim 29 wherein individually activating comprises activating said second and third power generators and deactivating said first power generator.

31. The method of claim 29 wherein individually activating comprises activating said first and third power generators and deactivating said second power generator.

32. The method of claim 29 wherein individually activating comprises activating said first and second power generators and deactivating said third power generator.

33. The method of claim 29 wherein individually activating comprises activating said first, second and third power generators.

34. The method of claim 29 wherein said individually activating comprises:

configuring said first, second and third power generators to a first activation configuration during a first phase of said etching said semiconductor wafer; and

reconfiguring said first, second and third power generators to at least a second activation configuration during at least a second phase of said etching said semiconductor wafer.

35. The method of claim 29 wherein individually activating comprises configuring said first, second and third power generators to a plurality of activation configurations during a corresponding plurality of phases of a duty cycle of said etching said semiconductor wafer.

36. The method of claim 29 further comprising independently varying power levels of said first, second and third power generators during said etching said semiconductor wafer.

37. A method for etching a semiconductor wafer, comprising:

providing a plasma reactor, including:

first, second and third power generators coupled to upper and lower electrodes; and

a controller for selectively activating said first, second and third power generators; and

controlling said first, second and third power generators with said controller to control said etching of said semiconductor wafer.

38. The method of claim 37 wherein controlling comprises individually activating in a first configuration at least one of said first, second and third power generators during at least one phase of said etching said semiconductor wafer.

39. The method of claim 38 further comprising individually activating in a second configuration at least one of said first, second and third power generators during at least another phase of said etching said semiconductor wafer.

40. The method of claim 36 wherein independently varying further includes varying each power generator power levels to produce a desired via profile.

41. A plasma reactor, comprising:

first, second and third power generators each operably coupled to one of upper and lower electrodes; and

a controller operably coupled to each of said first, second and third power generators, said controller further configured to selectively activate said first, second and third power generators in accordance with a variable duty cycle including at least first and second phases.